

## **Claims:**

We claim:

1. A process comprising  
mixing organic waste, one or more coal combustion by-products, and one or more alkaline additives to form an organic waste/coal combustion by-products/alkaline additive by-product mixture and causing ammonia to be liberated from said organic waste; and  
introducing said liberated ammonia into a coal burner of a coal burning power plant.
2. The process of claim 1, wherein the one or more alkaline additives is selected from the group consisting of lime, calcium hydroxide, limestone, cement kiln dust, and lime kiln dust.
3. The process of claim 1, wherein said mixing further includes mixing lime with the organic waste, coal combustion by-products, and one or more alkaline additives.
4. The process of claim 1, wherein said organic waste comprises waste selected from the group consisting of sewage sludges, animal manures, pulp and paper waste, fermentation waste, food waste, paper and cardboard, and other industrial organic waste.
5. The process of claim 1, wherein said coal combustion by-products comprise at least one by-product selected from the group consisting of fly ash, fluidized bed ash, flue gas desulfurization by-products, lime, calcium hydroxide, calcium carbonate, and mixtures thereof.

6. The process of claim 1, wherein the one or more coal combustion by-products include fly ash.
7. The process of claim 1, wherein the organic waste/coal combustion by-products/alkaline additive by-product mixture has a pH of at least 9.5.
8. The process of claim 1, further comprising mixing the organic waste/coal combustion by-products/alkaline additive by-product mixture with coal.
9. The process of claim 8, wherein the coal is pulverized coal.
10. The process of claim 8, further comprising feeding the mixture formed by mixing the by-product mixture with coal into said coal burner.
11. A process comprising
  - mixing organic waste, one or more coal combustion by-products, and one or more alkaline additives to form an organic waste/coal combustion by-products/alkaline additive by-product mixture;
  - drying said organic waste/coal combustion by-products/alkaline additive by-product mixture with heat, causing ammonia to be liberated from said organic waste;
  - and
  - introducing said liberated ammonia into a coal burner of a coal burning power plant.
12. The process of claim 11, wherein the heat for said drying includes waste heat from said coal burning power plant.

13. The process of claim 11, wherein said drying comprises drying the organic waste/coal combustion by-products/alkaline additive by-product mixture to at least 50% solids.

14. The process of claim 11, wherein said drying comprises drying the organic waste/coal combustion by-products/alkaline additive by-product mixture to at least 75% solids.

15. The process of claim 11, further comprising reacting scavenged exhaust gases from the power plant with at least one reactive material so as to decrease the amount of pollutant gases in said exhaust gases.

16. The process of claim 15, wherein said reactive material comprises  $\text{Ca}(\text{OH})_2$ .

17. The process of claim 11, further comprising reacting scavenged exhaust gases from the power plant with at least one reactive material so as to reduce  $\text{CO}_2$  emissions from the power plant.

18. The process of claim 11, further comprising reacting scavenged exhaust gases from the power plant with at least one reactive material so as to reduce  $\text{SO}_2$  and  $\text{SO}_3$  emissions from the power plant.

19. An organic waste/coal combustion by-products/alkaline additive by-product mixture formed by a process comprising  
mixing organic waste, one or more coal combustion by-products, and one or more alkaline additives to form an organic waste/coal combustion by-products/alkaline additive by-product mixture.

20. A process comprising

mixing organic waste, one or more coal combustion by-products, and one or more alkaline additives to form an organic waste/coal combustion by-products/alkaline additive by-product; and

feeding the organic waste/coal combustion by-products/alkaline additive by-product into a coal burner of a coal burning power plant.

21. A process comprising

mixing organic waste, one or more coal combustion by-products, and one or more alkaline additives to form an organic waste/coal combustion by-products/alkaline additive by-product;

combining the organic waste/coal combustion by-products/alkaline additive by-product with coal; and

feeding the organic waste/coal combustion by-products/alkaline additive by-product and coal into a coal burner of a coal burning power plant.

22. The process of claim 21, wherein the coal is pulverized coal.

23. The process of claim 21, wherein said mixing further includes liberating ammonia from the organic waste and introducing the ammonia into the coal burner.

24. A soil additive comprising an organic waste/coal combustion by-products/alkaline additive by-product mixture formed by the process of claim 1.

25. A feed-stock comprising an organic waste/coal combustion by-products/alkaline additive by-product mixture formed by the process of claim 1.

26. A system comprising  
a coal burner of a coal burning power plant;  
a coal feed supplying coal to said coal burner; and  
an ammonia feed to said coal burner comprising ammonia liberated from organic waste upon mixing organic waste, one or more coal combustion by-products and one or more alkaline additives.
27. The system of claim 26, wherein the coal feed comprises coal and a mixture of organic waste, one or more coal combustion by-products and one or more alkaline additives.
28. The system of claim 27, wherein said coal is pulverized coal.
29. The system of claim 27, wherein said coal and said mixture of organic waste, one or more coal combustion by-products and one or more alkaline additives, are mixed and then pulverized.
30. A system comprising  
a coal burner of a coal burning power plant; and  
a feed of an organic waste/coal combustion by-products/alkaline additive mixture to said coal burner, comprising organic waste, one or more coal combustion by-products and one or more alkaline additives mixed together.
31. The system of claim 30, wherein said feed of an organic waste/coal combustion by-products/alkaline additive mixture further includes coal.
32. The system of claim 31, wherein said coal is pulverized coal.

33. The system of claim 31, wherein said coal and said mixture of organic waste, coal combustion by-products and one or more alkaline additives, are mixed and then pulverized.

34. A system comprising  
a coal burner of a coal burning power plant;  
an ammonia feed to said coal burner comprising ammonia liberated from organic waste upon mixing the organic waste with one or more coal combustion by-products, and one or more alkaline additives; and  
a coal feed supplying coal to said coal burner, which coal feed comprises coal and the mixture of organic waste, one or more coal combustion by-products, and one or more alkaline additives.

35. A process comprising  
mixing organic waste with one or more coal combustion by-products to form an organic waste-coal combustion by-product mixture;  
drying with heat the organic waste-coal combustion by-product mixture to at least 50% solids forming a dried organic waste-coal combustion by-product mixture and causing ammonia to be liberated from said organic waste; and  
introducing said liberated ammonia into a coal burner of a coal burning power plant.

36. The process of claim 35, wherein the organic waste-coal combustion by-product mixture has a pH of at least 9.5.

37. The process of claim 35, wherein said mixing further includes mixing lime with the organic waste and coal combustion by-products.

38. The process of claim 35, wherein said organic waste comprises waste selected from the group consisting of sewage sludges, animal manures, pulp and paper waste, fermentation waste, food waste, paper and cardboard, other industrial organic waste, and mixtures thereof.

39. The process of claim 35, wherein said coal combustion by-products comprise at least one by-product selected from the group consisting of fly ash, fluidized bed ash, flue gas desulfurization by-products, lime, calcium hydroxide, calcium carbonate, and mixtures thereof.

40. The process of claim 35, wherein drying takes place in at least one dryer.

41. The process of claim 40, wherein said dryer is selected from the group consisting of direct concurrent flow dryers, horizontal single, double and triple pass indirect dryers, and vertical counter flow rotating disk indirect dryers.

42. The process of claim 35, wherein said drying is conducted using a direct dryer.

43. The process of claim 35, wherein said drying is conducted using an indirect dryer.

44. The process of claim 35, wherein the heat for said drying includes waste heat from said coal burning power plant.

45. The process of claim 35, wherein said drying comprises drying the organic waste-coal combustion by-product mixture to at least 75% solids.

46. The process of claim 35, wherein when said coal combustion by-product comprises an alkaline mineral by-product, the drying step produces a further by-product.

47. The process of claim 35, further comprising reacting scavenged exhaust gases from said drying with at least one reactive material to decrease the amount of CO<sub>2</sub>, SO<sub>2</sub> and SO<sub>3</sub> in said exhaust gases and thereby decrease emissions from the drying.

48. The process of claim 47, wherein said reactive material comprises Ca(OH)<sub>2</sub>.

49. The process of claim 35, further comprising mixing the dried organic waste-coal combustion by-product mixture with coal.

50. The process of claim 49, wherein the coal is pulverized coal.

51. The process of claim 49, further comprising feeding the mixture formed by mixing the by-product with coal into said coal burner.

52. A process comprising  
mixing organic waste, one or more coal combustion by-products to form an organic waste/coal combustion by-products mixture; and  
feeding the organic waste/coal combustion by-products mixture into a coal burner of a coal burning power plant.

53. A process comprising  
mixing organic waste and one or more coal combustion by-products to form an organic waste/coal combustion by-products mixture;



combining the organic waste/coal combustion by-product mixture with coal;  
and

feeding the organic waste/coal combustion by-products mixture and coal into  
a coal burner of a coal burning power plant.

54. The process of claim 52, wherein said organic waste/coal combustion by  
product mixture further comprises one or more non-alkaline additives.

55. A further by-product produced by a process comprising  
mixing organic waste with at least one alkaline coal combustion by-product  
to form an organic waste-coal combustion by-product mixture and a further by-  
product.

56. A further by-product produced by a process comprising  
mixing organic waste with at least one alkaline coal combustion by-product  
to form an organic waste-coal combustion by-product mixture; and  
drying with heat the organic waste-coal combustion by-product mixture to at  
least 50% solids forming a dried organic waste-coal combustion by-product mixture  
and a further by-product

57. A dried organic waste-coal combustion by-product mixture formed by a  
process comprising  
mixing organic waste with one or more coal combustion by-products to form  
an organic waste-coal combustion by-product mixture; and  
drying the organic waste-coal combustion by-product mixture to at least 50%  
solids forming a dried organic waste-coal combustion by-product mixture.

58. The dried organic waste-coal combustion by-product mixture of claim 57, wherein the organic waste-coal combustion by-product mixture has a pH of at least 9.5.
59. A process comprising  
mixing organic waste with one or more coal combustion by-products to form an organic waste-coal combustion by-product mixture;  
drying the organic waste-coal combustion by-product mixture to at least 50% solids forming a dried organic waste-coal combustion by-product mixture.  
combining the organic waste-coal combustion by-product with mixture with coal; and  
feeding the organic waste-coal combustion by-product mixture and coal into a coal burner of a coal burning power plant.
60. The process of claim 59, wherein the coal is pulverized coal.
61. The process of claim 59, wherein said mixing further includes liberating ammonia from the organic waste and introducing the ammonia into the coal burner.
62. A soil additive comprising a dried organic waste-coal combustion by-product mixture formed by the process of claim 35.
63. A feed-stock comprising dried organic waste-coal combustion by-product mixture formed by the process of claim 35.
64. A system comprising  
a coal burner of a coal burning power plant;  
a coal feed supplying coal to said coal burner; and

an ammonia feed to said coal burner comprising ammonia liberated from organic waste upon drying a mixture of organic waste and one or more coal combustion by-products.

65. The system of claim 64, wherein the coal feed comprises coal and a dried mixture of organic waste and coal combustion by-product.

66. The system of claim 65, wherein said coal is pulverized coal.

67. The system of claim 65, wherein said coal and said dried mixture of organic waste and coal combustion by-product are mixed and then pulverized.

68. A system comprising  
a coal burner of a coal burning power plant; and  
a feed of an organic waste-coal combustion by-products mixture to said coal burner, comprising organic waste and one or more coal combustion by-products mixed together.

69. The system of claim 68, wherein said feed of an organic waste-coal combustion by-products mixture further includes coal.

70. The system of claim 69, wherein said coal is pulverized coal.

71. The system of claim 69, wherein said coal and said mixture of organic waste and one or more coal combustion by-products, are mixed and then pulverized.

72. A system comprising  
a coal burner of a coal burning power plant;

an ammonia feed to said coal burner comprising ammonia liberated from organic waste upon drying a mixture of organic waste and coal combustion by-products; and

a coal feed supplying coal to said coal burner, which coal feed comprises coal and the dried mixture of organic waste and coal combustion by-product.

73. A process comprising  
liberating ammonia from organic waste; and  
introducing said liberated ammonia into a coal burner of a coal burning power plant.

74. A process comprising  
mixing organic waste with one or more coal combustion by-products to form an organic waste-coal combustion by-product mixture and causing ammonia to be liberated from the organic waste; and  
introducing the liberated ammonia into a coal burner of a coal burning power plant.